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Investigating the mechanism of the effect of cerium additives on the properties of the iron-potassium system-the active component of dehydrogenation catalysts of hydrocarbons Report 2

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Abstract

The properties of the Fe2O3-K2O and Fe2O3-K2O-CeO2 model systems with weight ratios of 80: 20 and 50: 20: 30, respectively, are studied by means of thermal, magnetic, X-ray and dispersion analysis, and low-temperature nitrogen adsorption. It is found that the successive formation of mono- and polyferrite phase occurs during the interaction of iron oxide and potassium carbonate. It is proposed that the activity of the iron-potassium catalyst is proportional to the content of the surface monoferrite phase. It is found that introducing cerium into the iron-potassium system leads to a redistribution of potassium mono- and polyferrites in the ferrite phase, raising the proportion of monoferrite. Introducing cerium therefore promotes the activity of the catalyst system. The results from this study will be used to develop new iron-potassium catalysts with high catalytic activity in the dehydrogenation of isoamylenes into isoprene.

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Keywords

catalytically active phase, cerianite, hematite, potassium carbonate, potassium mono- and polyferrites, solid-phase topochemical transformations